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THE NEW COLLEGE YEAR

The College of Agriculture opens the year 1920-21 with an unprecedented enrollment of 520. It also has 21 post-graduate students,—the greatest number in its history. Pangasinan furnishes the largest contingent, Batangas the second, Laguna the third, and Cavite the fourth. Only Agusan, Bukidnon, Davao, and Lanao are unrepresented. A number of foreign students are in attendance. Showing the greatest growth in its history, the College also faces some of its greatest difficulties, through lack of teachers and lack of adequate housing for students and faculty. As in years gone by, only one thing makes successful work at the College possible, and that is the remarkable loyalty of both the student body and the faculty.

Ten years ago when the project of a University College of Agriculture was dropped into the *bunduc* near Los Baños, with two tents and twelve students,—no building, no connecting road, no equipment, and hardly the beginnings of a faculty,—it required a rather vivid imagination to foretell a growth to even 100 students and certainly involved a profound faith in this country and its future. Today there are 520 students, representing every standard province in the Islands, and foreign students have attended from China, Siam, Guam, Java, and India. Today, in expanse, in activity, in number of buildings, in beauty of surroundings, in *promise for the future*, the College is beginning to assume the outward appearance of a great University College of Agriculture. Only now is it reaching the stage when it becomes the duty of the Government to extend to it the support necessary to a great University College—to make *real* and comparable with the best, all the many special features which go to make up such a college.

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In the earlier days of the College, men of vision, both in the University and outside of it, said that the College of Agriculture would never reach the point of becoming a really *effective* factor in the development of these Islands until the number of students passed 1000. This *is true*, and at the present rate of increase *this will be realized in 1925, provided the loyal support of the Government does not fail us.*

CHARLES FULLER BAKER,
Dean of the College of Agriculture.

THE AGRICULTURAL CONGRESS

World progress has shown that effective effort requires united effort. No longer is an individual the big factor he was in the comparatively small isolated community of yesterday, important as he is as a unit. Many industries have long realized the importance of association for mutual understanding, counsel, and help. The Farmers' Congress in the Philippines is broad in its scope; it aims to unite the farmers of the Islands into one big association for the purpose of discussing the agricultural outlook in the country, and for the purpose of presenting the interests of the farmers before the public, the government, and the commercial entities.

Quite often, however, the interests of the farmers of different sections are at variance; for example, when the price of rice rises, it affects the Central Luzon farmers favorably, but the effect is otherwise with the abaca growers of the Bicol provinces, and with the sugar planters of Negros. There is then the need for smaller units to handle local problems, and the Agricultural Congress cannot and does not intend to supplant these units. The field for local organizations is in fact richer in possibilities in the way of direct returns to the members than is the national association.

We understand there are such local associations in a number of provinces and municipalities, but they apparently lack intelligent leadership, as they are rather dormant. Would not it be possible to make of the Agricultural Congress a permanent central organization of these smaller societies with a permanent secretary to carry on its work throughout the year, instead of its present existence which flickers dimly ten months, flaming brightly just before the big gathering? The general secretary, located in Manila, would act in an advisory capacity to the local associations as to market conditions, opportunities, and as to fields of endeavor to which the societies might devote themselves.

In the United States the growth has been the other way; numerous local organizations in the form of co-operatives have been organized for purposes of marketing, wholesale buying, and for operating stores, creameries, cheese factories, banks, etc., and for owning stallions, bulls, and other high-priced breeding stock. A number of state associations have been formed as federations of these smaller units. To co-ordinate further the work of the different state associations, and for the purpose of presenting the interests of the farming community before national bodies, a federal association was recently organized.

In the Philippines the provincial and municipal organizations may undertake similar tasks in co-operation, and we venture to foretell that the benefit derived from them will be much greater, as due to very little competition here, the profits made by middlemen are often exorbitant.

While the Government might lend a helping hand in this undertaking, it is well for the farmers to see it through themselves, as the associations should be under their full control all the time in order that they may be free to dictate the service they require.

B. M. Gonzalez,
Of the Department of Animal Husbandry.

AN APPRECIATION

General regret is expressed throughout the College at the announcement of Doctor Sam F. Trelease that he will sever connections with College and return to the States. Doctor Trelease was brought up in a scientific atmosphere, his father, Doctor William Trelease, having been Director of the Missouri Botanical Garden and Dean of the Shaw School of Botany, and at present head of the department of botany of the University of Illinois. His own training in science has been the best America can give. He has been constantly looked to, at the College of Agriculture, for critical advice in scientific matters.

Doctor Trelease assumed the heavy burden of large laboratory classes with the greatest cheerfulness and carried also a heavy load of outside work, including the editorship of the College journal. He continued to smile under it all, until his health broke down. The College has deeply appreciated the services of Doctor Trelease, and acclaims him as a good pioneer. Doctor Trelease goes to a position in Johns Hopkins University.

Charles Fuller Baker,
Dean of the College of Agriculture.

THE ALUMNI ORGAN

The University of the Philippines Alumni Association is sponsor for a new publication, *The Philippine Alumnus*, the first number of which recently came to hand. The form and mechanical make-up of the journal are excellent. But here favorable comment must end.

Immediately within the covers one is informed that University Hall "might have been the Far-Eastern trysting-place of the Aristocracy of Brains and Character, had not the evil hand of Politics taken the Cause of Higher Education in its bloody grip." The editorial pages insinuate "trustee incompetence" and "presidential autocracy" and nominate the University as "a decadent and demoralized" institution "tobogganning down" to a high school level. Nothing of evidence is presented; the editor's tone savors of sovietism, and his attitude is entirely iconoclastic.

The editor has made of his pages a corridor for slapstick irony and quarrelsome opinion. His charge seems to be that the University is more indebted to its graduates than they to their University. We hold no brief for the University of the Philippines Alumni, but an outsider can scarcely believe that any body of alumni should care to support an editorial policy so utterly derogatory of their Alma Mater.

Evett D. Hester,
Of the Department of Rural Economics.

A REVIEW OF "PHILIPPINE DOWNY MILDEW OF MAIZE" [1]

By N. B. MENDIOLA
Of the Department of Agronomy

Doctor Weston's paper should prove interesting to the Philippine readers of the *Agriculturist* not only for its scientific importance to Philippine agriculture but also because it characterizes the wise and liberal policies with which the United States Government is solving the agricultural problems of that country. In these policies our local Government has much to find by way of example.

The Philippine downy mildew is one of several downy mildew diseases of maize, sugar cane, and other economic grasses. It was only in 1916 when the occurrence and destructive power of the disease was first described by our dean, Prof. C. F. Baker. Although it is oriental in distribution, the United States Department of Agriculture in 1918 detailed Dr. W. H. Weston to determine the distribution and life history of the organism causing the disease in the Philippines. The United States Government expects that, with the results of such a study in hand, methods of control may be devised and should the disease be able to break through the quarantine now in force in that country, probable spread over the corn regions could then be checked.

At present it might appear an extravagance on the part of the Philippine Government to send to the United States, for example, a man to study diseases of American corn with a view to safeguarding the corn industry in the Philippines, and yet, the experience of other countries shows that the Philippines must do more than that as soon as it can afford to do so if our agriculture is to progress. Meanwhile, it is to be hoped that the United States Department of Agriculture as well as agricultural associations of different countries will send more men to the Philippines to carry on scientific investigations here, for in work of this kind, the Philippines have all to gain and the results will go a long way to make up for the present lack of scientific investigators in the Philippine field.

The paper under review is a discussion of the general characters of the causal organism and of the systematic relationship of this to other downy mildews in the Orient. The paper is a result of experimental and investigational work, a greater part of which was done at the College of Agriculture.

ECONOMIC IMPORTANCE IN THE PHILIPPINES

The disease, downy mildew, occurs in at least seventeen provinces in the Philippines. It is not known at present how much loss is suffered by the country through the ravages of this mildew, but limited observations have shown that as much as 60 per cent of the crop may be lost and as high as 82 per cent of infection has been counted. When the disease is severe the attacked plant is stunted and weakened, death resulting in about one month after planting. When the attack is moderate, fair growth is possible and the plant even produces a small deformed ear. Infected plants are rendered susceptible to the attacks of a number of secondary parasitic organisms such as species of *Pythium* and of *Helminthosporium*, which may hasten the death of the victim.

[1] An article by Dr. William H. Weston, Jr., published in the Journal of Agricultural Research 19: 97-122. 1920.

SYMPTOMS

There are many factors which govern the effect of the disease on the corn plant and which cause difficulty in diagnosis. However, loss of chlorophyll in defined areas of the leaf, the production of a whitish down of conidiophores mainly on the chlorotic area and alteration in the form or the normal growth of the plant are the general symptoms. Of these, change of color is the most conspicuous but not the surest symptom. For example, it is known that in both the seedling and in older stages of the corn plant there are strains which exhibit similar coloration as infected plants. The distinction between such natural strains and the plants infected with downy mildew still remains both for the mycologist and the geneticist to establish. Weston also points out that in diseased plants there occur various forms of malformation and monstrosties of the ear and tassel, and seems to imply some positive correlation between these abnormalities and the presence of the mildew. There is however a need of better scientific evidence to support the supposed correlation, for to my knowledge it is generally recognized that some such abnormalities are genetic in or of evolutionary origin. The safest indication of the disease is said to be the characteristic downiness.

OTHER HOSTS

In the acclimatization plots at the College of Agriculture, the disease was found also attacking teosinte (*Enclaena luxurians* Schrod.) and sorghum (*Andropogon sorghum* (Linn.) Brot.) Weston states that hybrids of maize and teosinte are also susceptible to the disease and that the degree of susceptibility and the effect on the plants attacked are intermediate between those shown by the two ancestors. It is not stated, however, what variety of corn was involved in the cross and no data were given to support the latter observation. Diligent search has failed to show that other members of the Maydeae and Andropogoneae are susceptible to the maize downy mildew. Other related Gramineae were inoculated but these did not take on the disease. These results are not considered conclusive by Weston although they are taken to indicate that these relatives are much less susceptible to the attack of the disease.

THE CAUSAL ORGANISM

The fungus which causes the Philippine downy mildew of maize belongs to the genus *Sclerospora* of the Peronosporaceae, as was reported by Baker. The mycelium generally invades the entire host tissue, the vegetative parts the most severely and the root the least. The hyphae are almost invariably intercellular in position wherever they are found. They occupy even the smallest spaces between the cells and sometimes force adjacent cells apart as they grow between them. There are two types of hyphae both of which produce conidia, one is long and slender, the other is lobed and contorted. The hyphae are hyaline, rarely septate, thin-walled, with granular contents, and vary in size, the typical diameter being 8 microns. The haustoria are similar to the hyphae in structure and are about 8 microns long by 2 microns in diameter.

In general conidiophores are produced on any part of the plant except the roots. Under favorable conditions, conidiophore development and conidia production take place at night by a process which Weston states has never been described. Conidiophores may produce as few as three conidia and as many as 96, depending on their vigor. Conidiophores vary greatly in size. Under an

abundance of dew, the length varies from 260 to 400 microns, while under less favorable dew conditions, the length is 160 to 200 microns only. The greatest width varies from 15 to 26 microns.

At the mature stage, the conidia are generally elongate, ellipsoid, elongate-ovoid, or rounded cylindrical in shape, are thin-walled and hyaline and have fine granular contents. The length and width of 400 conidia were found and the ratio of length to diameter determined. A biometric treatment of the results shows that the predominating size is 34 microns by 18 microns. The typical length range is 27 to 39 microns while that for the diameter is 17 to 21 microns.

The Philippine maize *Sclerospora* is at present known only in its conidial phase. Resting bodies usually met with in other genera of the Peronosporaceae, such as chlamydospores and parthenogenetic or normal oogonia, have not been found with the conidial form. In this connection the author points out the fact that a *Sclerospora* has been found attacking *Saccharum spontaneum*, in the oogonial stage, and a possible connection between this fungus and that on the maize is suspected.

The fungus causing the Philippine maize downy mildew is considered by Doctor Weston as belonging to a new species which he names *Sclerospora philippinensis* n. sp. He states, however, that a comparison with several species which occur so far only in oogonial stage is impossible since the Philippine type is not known in this form. The Philippine form has heretofore been regarded as identical with the Indian species (*Sclerospora maydis* (Rac.) But.) and Weston admits two principal points of resemblance, namely, the similarity in both shape and size of the conidia and the lack of any other type of spore. However, other considerations led him to consider the fungus, for the present at least, as belonging to a new species. He declares that the sterigmata of the *maydis* type are much larger than those of the Philippine species. He considers the former to be 15 to 20 microns long while he found the latter to be generally 10 microns long. Moreover, it is considered that the Indian form is less and more strictly destructive and that while with the Indian species the stunting of growth and the branchy appearance of the plant is an important characteristic, with the Philippine form, this feature is only one and not the most striking effect of the disease.

While Weston considers the matter of the identity of the causal organism as necessarily unsettled, he believes the name *Sclerospora maydis* is strictly an untenable one, for this name was applied by Butler to the Indian species on the assumption that it was identical with the Javan. Recent work of Palm, however, has shown that the Javan fungus is a distinct *Sclerospora* species.

CONCLUSION

The Philippine downy mildew of maize occurs in many provinces of the Philippines where it may cause no less than 60 per cent loss or 82 per cent infection. The growing of corn has been abandoned in several localities as a result of this disease.

The presence of this mildew on the corn plant is best judged from the presence of a whitish down of conidiophores on chlorotic areas, especially on the leaf. The disease shows other symptoms which may be confused with the effects of other factors.

The disease was found also on teosinte (*Enclaena luxurians* Schrod.), on sorghum (*Andropogon sorghum* (Linn.) Brot.) and on hybrids of corn and teosinte. Artificial inoculations failed to infect related Gramineae showing that they are highly resistant, if not immune to this mildew.

The organism which causes the Philippine maize downy mildew and which was first reported by Baker under the name *Sclerospora maydis* But. is now considered a new species which Weston proposes to call *Sclerospora philippinensis* n. sp. The identity of the causal organism is, however, not yet thoroughly and conclusively established.

SOME POINTS TO CONSIDER IN CHOOSING A RESEARCH PROBLEM

"(1) The study should be new; it should add something to science or to the application of science to agriculture.

(2) The study should be of some good; it should have a practical bearing on science, or should have some practical application to agriculture. Its results should enable one better to interpret practical observations.

(3) The results of the study should enable one to predict what would happen under similar conditions.

(4) The work should be capable of being performed economically.

(5) The work should be of a kind that may be done efficiently; the value of the results should be great in proportion to the work necessary to obtain them.

(6) If possible the work should have some comparatively permanent value.

(7) The work should lead somewhere; it should open up new lines of work."

A PRELIMINARY STUDY ON THE MINERAL NUTRITION OF YOUNG COTTON PLANTS[1]

By Rafael B. Espino
Of the Department of Plant Physiology

A review[2] of the limited number of investigations on cotton in the Philippine Islands has shown that in the Philippines the study of cotton has barely been begun and that the work has been field trials only. The present paper deals with the results obtained from preliminary experiments on the salt-requirements of cotton.

The experiments were carried out in pots, each of which contained 600 cubic centimeters of soil obtained from a piece of land never put under cultivation and which was covered with cogon (*Imperata spp.*). In all probability the soil contained some substances toxic to plants, as was reported by Villegas (1) and was rather destitute of minerals or salts in condition suitable as nutrients for ordinary farm crops. In chemical or physical composition the soil medium employed is not definitely known, because analyses have not been made. The physical appearance, however, shows it is mostly clay, so that it is a solid medium which, according to results of some investigators, is not very suitable for a delicate crop like cotton. But this kind of soil can be expected to serve as one of the best solid media for this kind of study, because the growth and development of the plants grown in it depend not much upon the solid medium but upon the kinds of fertilizers applied in it. Moreover, if the cogon soil, which is noted for giving poor growth of plants, could be improved by the proper addition of salts or by the proper application of one or more fertilizers, then the extensive areas which lie idle or unproductive, might be made productive. It was from this point of view that this soil was selected for the work. At the same time the results are expected to throw some light on the salt-requirements of the young cotton plants, at least of the species *Gossypium hirsutum* and under the aerial and soil conditions present during the period of the study.

The present study was carried out only for a comparatively short period beyond the seedling stage of the plant, because the volume of the soil (600 cubic centimeters only) was inadequate for mature plants. McCall and Richards (2) have proved that the early growth and development of a certain variety of wheat required a set of salt proportions different from that needed by the later development of the same species of plant in order to obtain the best results. The same principle might hold true also in the case of this species of cotton. Should circumstances permit, the writer hopes to be able to subject the cotton plant to a similar test. Whatever may be the value of this piece of work, it should be emphasized here that it is only a preliminary investigation on the large problem of the salt-requirements of the cotton plant. But in this work an attempt was made to employ the modern systematic method of attack employed by Schreiner and Skin-

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[1] Experiment Station contribution No. 37 The experimental work was mainly carried out by Severo Yap and Domingo Baybay, both members of the Agronomy II class.

[2] Espino, R. B. Cotton. (In press.)

ner (3) by Tottingham (4), by Shive (5), and by several other workers. But some errors in the preparation of the culture solutions were not observed until the experiments were completed. The proportions of the three salts used, as corrected, are shown in Table I. It should be stated further that although this attempt may open the field for further investigation, no claim is made that the conclusions are definite.

PREPARATION OF THE MEDIUM

The soil.—As already stated the solid medium was cogon soil. A large quantity of this soil was obtained and was deposited in a single heap on the lawn where it would not be mixed with other kinds of soil. Here this cogon soil was shoveled until thoroughly mixed. The large lumps were pulverized, and stones and other foreign bodies were taken out. This soil was used to fill the pots up to the brim. The solid medium was then ready for the addition of the fertilizers and transplanting of the seedlings. Some of the remaining soil from the large pile was placed in two large earthen jugs (*tapayan*) with a capacity of 55 liters each, and enough tap water was added to fill each jug to the neck. The soil and water in the jugs were stirred for some time, and a great deal of the suspension of fine soil particles was allowed to settle. Then the liquid on the top of the soil was carefully drawn out and poured into demijohns. After a further dilution with clear tap water the liquid was used as the solvent in this investigation. This cogon soil extract was used as the solvent and was added to the limited amount of cogon soil in the pots whenever the salts were added, in order to replace whatever liquid substance may have been taken out of the pot through drainage, and to replace those substances converted by certain organisms from one form to another. In other words certain substances naturally found in the cogon soil were added to the pots whenever a certain amount of the culture solutions were supplied the plant.

The nutrient solutions.—The salts used in this work were all "Baker's analyzed," mono-potassium phosphate (KH_2PO_4) calcium nitrate [$Ca(NO_3)_2$,] and magnesium sulphate ($MgSO_4$) similar to the three main salts employed by Shive in 1914. The KH_2PO_4 and the $MgSO_4$ salts were prepared in a one-fourth molecular concentration. The $Ca(NO_3)_2$, however, was *unintentionally* used in molecular concentration, the solvent used being distilled water[3].

The culture solutions were next prepared. A one-liter bottle was partly filled with the cogon extract. Into this the required amount of each of the three salts was added in the proportion shown in Table I.

After adding all the three necessary salts, enough soil extract was added to make one liter of the solution. One-half of this was added to one pot, and the remaining half was poured into the duplicate pot. The two cultures that were used as control received each, only 500 cubic centimeters of the soil extract. None of the cultures received the trace of iron salt usually added to the culture when the solvent employed is distilled water, because the soil used is rich in iron salts.

In order to supply the plants in the pots with the necessary moisture and with the three salts, the culture solution was added to the pot every three days. And to reduce, as much as possible, the evaporation of moisture from the pots, pieces

[3] Distilled water was used as solvent of the salts, in order to avoid the formation of precipitate in the single salt stock solution.

of banana leaf-sheaths were placed on the surface of the soil in each pot. With these precautions it was found possible to carry out these cultures without, at any time, making the soil medium either too dry or too wet,—conditions which, when present, are known to interfere with the normal physiological activities of most plants.

TABLE I.—*Amount of each salt, in one-fourth volume molecular concentration, that was added to the soil extract to make 500 cubic centimeters of the culture solution.*

Culture No.	KH_2PO_4.	$Ca(NO_3)_2$.	$MgSO_4$.
	cc.	*cc.*	*cc.*
1	0.5	2.0	2.5
2	0.5	4.0	2.0
3	0.5	6.0	1.5
4	0.5	8.0	1.0
5	0.5	10.0	0.5
6	1.0	2.0	2.0
7	1.0	4.0	1.5
8	1.0	6.0	1.0
9	1.0	8.0	0.5
10	1.5	2.0	1.5
11	1.5	4.0	1.0
12	1.5	6.0	0.5
13	2.0	2.0	1.0
14	2.0	4.0	0.5
15	2.5	2.0	0.5

THE PLANT AND ITS CLIMATIC ENVIRONMENT

On November 20, 1919 a sufficient quantity of cotton seed was germinated in a shallow wooden box. About four or five days later practically all the seeds had germinated, indicating that the seeds used were of fairly high vitality. On December 12 the seedlings were about ten centimeters high and bore two cotyledons. From this stock, apparently uniform and vigorous seedlings were selected and removed from the germination box; care was taken that the roots were not seriously injured. The seedlings were transplanted into the culture pots, one plant to each. From that time on the culture solution was added to the pot once every three days, until the culture was ended on January 26, 1920.

Besides soil conditions, climatic conditions are very influential in determining plant growth and response. The records for these were obtained by the weather observer for the College. These records show that during the experimental period of forty-six days there was very little rainfall, 40 days had practically none and in 26 days of these the record for rainfall was zero, while the remaining 14 days, the record for each day was always below 5 mm. The maximum rainfall recorded during this period was only 33 mm. on January 4. This information tends to show that there was little chance for the culture solutions applied to drain out of the pots and that the culture medium was never too saturated with water to interfere with the normal rate of respiration in the roots. The cultures were also never too dry, the culture solutions were added every three or four days and the upper surface of the soil in each pot was covered with pieces (of suitable size) of leaf-sheaths of banana.

The maximum temperature recorded for the period of this study was 28°C. on December 12, January 11, and 12. The minimum was 18. 6°C. on January 24. Maximum and minimum temperatures were observed each day, from which a mean temperature was calculated. Of all the mean temperature records obtained,

the highest was 25.5°C. on December 24, and the lowest was 21.7°C. on December 30. These temperature data show plainly that the temperature of the air during this investigation was never too high nor too low to interfere with the normal order of processes taking place in the soil medium here employed or in the body of the plants under observation.

PRESENTATION OF RESULTS

In any experiment where living organisms are involved, especially plants, there is the usual appearance of slight discrepancies in the results. These are due, in part, to the individual variations of the organisms employed, and also due to unknown environmental conditions not under the control of the investigator. In the present study, for example, although a great deal of care was taken to select seedlings apparently uniform in development, yet the results obtained still show discrepancies, but these discrepancies are so slight that they cannot in the least affect the value of the findings obtained. It was deemed advisable to employ at least five criteria. The following were used: (1) Total number of leaves; (2) approximate area of five largest leaves, (3) height of stem; (4) diameter of stem at base; and (5) green weight of top.

In studying the salt-requirements of the cotton plants, although the results obtained are presented in these five criteria, important as they are, it must be admitted that the criterion which may surpass in importance any one of the five criteria herein presented, is the quantity and the quality of the fiber produced. Unfortunately, because of reasons already explained, the bolling stage of the plants was not attained. It must be borne in mind that one of the objects of this study is to find out the sets of salt proportions best suited for the improvement of nutrient conditions of a clay-sand soil that had never been put under cultivation and on which cogon had been growing. It must be admitted, further, that the development of the root system should be included in any study of this sort. The roots were not used as one of the criteria because of the difficulty of separating them from the soil. But it should be said that the root systems in all the cultures appeared fairly well developed.

Without attempting to explain the merits and weaknesses of each of the criteria here employed, we will pass on directly to the actual quantitative values of the results obtained. These values are shown in Table II.

Before going into the discussion of the numerical data given in Table II, it should be explained how these data were obtained. The "number of leaves" is here used to mean all the leaves that the plant in each culture had at the time of harvest. Each of the numerical data giving the "approximate area of five largest leaves" was obtained by multiplying the length of the main vein of the leaf by the maximum width of the leaf, and the approximate areas thus obtained from the five leaves of each culture were added, and the sum is shown in this table. The "height of the stem" was obtained at the end of the experiment, this height is from the base of the stem to the last visible portion of the stem at the main apex. The "diameter of the stem" was measured by means of a microcaliper. The "green weight of top" was obtained by weighing the severed stem and leaves on a balance. Care was taken to make this weighing in as short a time as possible, to avoid errors due to transpiration or metabolic changes. All the weighing was completed within one-half hour.

TABLE II.—*Numerical data for the duplicate sets of cultures of young cotton plants.*

Culture No.	Number of leaves.		Approximate area of 5 largest leaves.		Height of stem.		Diameter of stem.		Weight of green top.	
	a	b	a	b	a	b	a	b	a	b
			sq. cm.	*sq. cm.*	*cm.*	*cm.*	*mm.*	*mm.*	*gm.*	*gm.*
1	7	6	201	285	12.4	12.0	3.0	3.5	4.2	7.1
2	11	8	401	412	19.4	17.5	4.0	4.0	13.9	11.2
3	12	8	535	366	22.2	15.0	5.0	4.0	18.6	10.7
4	18	13	642	487	21.5	18.0	4.5	4.5	22.6	15.4
5	13	16	561	581	15.2	21.5	4.0	4.5	15.0	19.4
6	8	6	328	235	14.7	12.6	3.0	3.0	8.6	6.0
7	10	8	404	239	16.6	13.0	4.0	3.0	14.0	7.9
8	15	15	633	479	21.0	22.1	4.5	4.5	20.0	16.7
9	13	11	492	555	18.7	16.5	4.0	4.5	16.3	15.8
10	8	8	300	266	16.1	16.0	3.5	3.0	7.6	7.2
11	10	8	364	279	17.5	13.7	3.5	3.5	11.7	7.2
12	13	19	476	498	22.0	21.0	5.0	4.5	16.9	18.4
13	6	9	260	352	12.5	13.2	3.0	3.5	6.0	8.5
14	14	9	534	400	21.6	15.5	4.5	4.0	19.5	11.7
15	7	8	261	261	15.4	14.6	3.5	3.5	7.4	7.2
Control	5	7	110	136	9.0	10.5	2.0	2.5	2.7	3.6

The data of Table II are presented in Table III in such a way as to show high, low, and medium values. The five cultures which gave the highest consecutive values are considered as giving high yields, and the five cultures that gave the lowest consecutive values are regarded as giving low yields. The remaining cultures in the set of fifteen were considered to belong to the medium group. Each of the cultures that gave the high yield is indicated in Table III by an H, the cultures that gave low results, by an L, and those that gave medium results by an M. Whenever the fifth, or the lowest, numerical value in the high group is present in two or more cultures, this value is either placed with the H group, or all of the similar or like cultures are thrown into the H group. Likewise, if two or more cultures are found with the same low numerical value (a value which by this arbitrary method of selection belongs to the L group) the cultures are placed in the M group.

TABLE III.—*Results obtained under the different criteria, as expressed in an arbitrary way of grading the yields of the cultures in the high, medium, and low groups.*

Culture No.	Number of leaves.		Approximate area of 5 largest leaves.		Height of stem.		Diameter of stem at base.		Weight of green top.	
	a	b	a	b	a	b	a	b	a	b
1	L	L	L	M	L	L	L	L	L	L
2	M	M	M	M	M	M	M	M	M	M
3	M	M	H	M	H	M	H	M	H	M
4	H	H	H	H	H	H	H	H	H	H
5	H	H	H	H	M	H	M	H	M	H
6	L	L	L	L	L	L	L	L	L	L
7	M	M	M	L	M	L	M	L	M	M
8	H	H	H	H	H	H	H	H	H	H
9	H	H	M	H	M	H	M	H	M	H
10	L	M	L	L	L	M	L	L	L	L
11	M	M	M	L	M	L	L	L	M	L
12	H	H	M	H	H	H	H	H	H	H
13	L	M	L	M	L	L	L	L	L	M
14	H	M	H	M	H	M	H	M	H	M
15	L	M	L	L	L	M	L	L	L	L

Examining Table III, it will be found that some of the duplicate cultures under each criterion do not agree, but such disagreements are usually encountered in studies of this sort, and their probable causes have already been mentioned. There are other duplicate cultures, however, which agree in every respect, whether the cultures be in the H, M, or L group. For example, for the H group, cultures 4 and 8 agree under the five criteria, for the M group culture 2 gave M values under the five criteria, and for the L group, culture 6 gave L values throughout. Low yields are also indicated for cultures 1, 10, 13 and 15. The most important point to note in the results shown in Table III is the fact that although disagreements appear, these are relatively few and are not very great. Thus a culture may give, by the various criteria, H and M values, or M and L values, but never H and L values.

An average from each of the duplicate cultures in Table III was obtained. Whenever the results from any duplicate cultures appeared as M and H, this was converted into M, and when the results appeared as M and L, the average is expressed as L. Table IV shows the average of each of the duplicate cultures under each criterion. It also shows the average of the averages and the proportions of the three main salts used in each culture.

TABLE IV.—*Proportions of the three salts used; the average of two similar cultures under each of the five criteria and the average of all the averages.*

Culture No.	Salt proportions.			Number of leaves.	Approximate area of 5 largest leaves.	Height of stem.	Diameter of stem at base.	Weight of green top.	Average of averages.
	KH_2PO_4	$Ca(NO_3)_2$	M_3SO_4						
1	*1*	*4*	*5*	L	L	L	L	L	L
2	1	8	4	M	M	M	M	M	M
3	1	12	3	M	M	M	M	M	M
4	**1**	**16**	**2**	H	H	H	H	H	H
5	1	20	1	H	H	M	M	M	Mh
6	*2*	*4*	*4*	L	L	L	L	L	L
7	2	8	3	M	L	L	L	L	Lm
8	**2**	**12**	**2**	H	H	H	H	H	H
9	2	16	1	H	M	M	M	M	Mh
10	**3**	**4**	**3**	L	L	L	L	L	L
11	3	8	2	M	L	L	L	L	Lm
12	3	12	1	H	M	H	H	H	Hm
13	*4*	*4*	*2*	L	L	L	L	L	L
14	4	8	1	M	M	M	M	M	M
15	*5*	*4*	*1*	L	L	L	L	L	L

An examination of Table IV reveals the fact that cultures 4 and 8 are examples of the group that gave the highest yield in all the five criteria here used. Culture 12 might also be included in the high group. Cultures 4 and 8 are characterized by possessing very high content of calcium nitrate with relatively low contents of mono-potassium phosphate and magnesium sulphate. The proportion of the three salts in these two cultures are shown in this table in bold-face type.

Other cultures that have high content of calcium nitrate also gave fairly high yields, but with the five criteria discrepancies may be seen. These discrepancies show that these cultures, 5, 9, and 12, have the tendency to become M. This is probably due to the fact that although the calcium nitrate content of the culture is high, the magnesium sulphate content is extremely low.

The salt proportions of the cultures that belong perfectly to the L group are shown in the table in italics. These cultures are characterized by having much lower relative contents of calcium nitrate than any culture in the H group possesses. In many cases, the L group is characterized, further, by about equal amounts of calcium nitrate and magnesium sulphate and it appears that these poor cultures were obtained irrespective of the amount of mono-potassium phosphate. The very poor cultures 1, 6, 10, 13 and 15 have either the lowest value of mono-potassium phosphate or the highest value.

The salt proportions of the only two cultures that gave the highest yield (without any discrepancy) may be tabulated as follows:

Culture No.	KH_2PO_4.	$Ca(NO_3)_2$.	$MgSO_4$.
4	1	16	2
8	2	12	2
Average	1.5	14	2

In a similar manner the cultures that had low yields throughout, may be tabulated as follows:

Culture No.	KH_2PO_4.	$Ca(No_3)_2$.	$MgSO_4$.
1	1	4	5
6	2	4	4
10	3	4	5
13	4	4	2
15	5	4	1
Average	3	4	3

In order to contrast the fertilized with the unfertilized cultures, Table V is presented. In this table are shown only the highest and the lowest yields from the fertilized cultures under the five criteria, on the one part, and the results obtained from pots which were not fertilized at all, on the other.

TABLE V.—*Highest and the lowest yields from fertilized pots as compared with those from the unfertilized pots (control).*

Maximum and minimum yields.		No. of leaves.		Approximate area of 5 largest leaves.		Height of stem.		Diameter of stem at base.		Weight of green top.	
		a	b	a	b	a	b	a	b	a	b
				sq. cm.	*sq. cm.*	*cm.*	*cm.*	*mm.*	*mm.*	*gm.*	*gm.*
Fertilized pots.	Highest.	18	19	642	581	22.2	22.1	5.0	4.5	22.6	19.4
	Lowest.	6	6	201	235	12.4	12.0	3.0	3.0	8.6	6.0
	Control.	5	7	110	136	9.0	10.5	2.0	2.5	2.7	3.6
				sq. cm.		*cm*		*mm.*		*gm.*	
Fertilized pots.	Highest.	18.5		611.5		22.15		4.75		21.00	
	Lowest.	6.0		223.0		12.20		3.00		7.30	
	Control.	6.0		123.0		9.75		2.25		6.15	
Percentage of increase over the yield of the control by the	Highest.	208		397		127		111		261	
	Lowest.	0		81		23		33		19	

Table V shows that there is a very close agreement between any of the duplicate cultures under the five criteria, as are shown in the upper portion of the table. The middle portion of the table shows the average of each of the duplicate cultures. This is given in order to simplify the task of making the comparison of the yields obtained from the highest and the lowest yields in the fertilized pots and those from the control. The lower portion of the table shows the percentage of the increase of the yields of the fertilized pots over those of the unfertilized ones. The data in the lower portion of this table plainly show that the addition of the three salts to the culture materially increased the growth and development of the young cotton plants here used over the yields obtained from the cultures that received no salt application at all. That the increase of the yields from the fertilized pots over the unfertilized ones, under the five criteria here used, ranges from 397 to 111 per cent, is quite evident from this table. Even the yields of the poorest culture are from zero to as high as 81 per cent over those obtained from cultures used as controls. In other words, there remains not the least doubt that the application of the three salts here employed with any of the proportions tested has increased the growth and development of the young cotton plant and has improved the food-material supplying power of the cogon soil here employed.

SUMMARY AND CONCLUSIONS

1. The present study deals with the mineral nutrition of the young cotton plant. It is only preliminary in nature and does not claim to have solved to any extent the mineral food problem of this plant. This study, however, is probably the first of its kind that has ever been made in the Philippines and may open the way for further investigation.

2. Another object of this investigation is the determination, by actual cultural test, of the sets of the salt-proportions best suited for the improvement of the physical or chemical properties of the cogon soil. This improvement, if practised, might lead to the conversion of the vast area of cogon soil that is now idle and non-productive, and often contains substances toxic to ordinary crop plants, into a useful and productive condition.

3. Under the set of environmental conditions met during the progress of this study and with the use of certain of the salt-proportions here employed the yield of the young cotton plant grown in cogon soil in pots could be improved to as high as 397 per cent over the unfertilized pots.

4. It appears that the best, or the most suitable, salt proportion here tested for the young cotton plants has an extraordinary high content of calcium nitrate [Ca $(NO_3)_2$]. As an average of the salt-proportions of the two cultures that proved to be the best under the five criteria here employed, the best culture would have 1.5 parts by volume of mono-potassium phosphate (KH_2PO_4), 14 parts of calcium nitrate [Ca $(NO_3)_2$], and 2 parts of magnesium sulphate ($MgSO_4$).

5. It appears that the least promising sets of salt-proportions are characterized by having, as an average, 3 parts by volume of mono-potassium phosphate (KH_2PO_4), 4 parts of calcium nitrate [Ca $(NO_3)_2$], and 3 parts of magnesium sulphate ($MgSO_4$).

6. It appears also, that our cogon soil can be improved chemically or nutritively, at least for the young cotton plant, by the addition of ample quantity of calcium nitrate [Ca $(NO_3)_2$], or probably any commercial fertilizer that con-

tains both the calcium and the nitrate radicals. In other words, our cogon soil is probably deficient in these salts or radicals of this salt, a contention which confirms the conclusion of Navarro (6) that the application of lime to cogon soil is decidedly beneficial and the cogon soil is deficient in nitrogen in any form.

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One of the greatest scientists of this generation, a man who by tireless and original investigation has dug through to everlasting truths, hits the target when he says:

"One of the most difficult things in the world is to recognize a great truth, to feel its significance and yet not be carried away by it. Great scientific errors are frequently due not so much to faulty observations as to sweeping conclusions. As a test of truth, logic is inferior to experience; its faults are not so much in its methods as in its premises and applications. For this reason a logical chain has led many a man into the bondage of error.

"Truth is not usually found in extremes, but rather in some middle course which is less striking but more judicious."—*Saturday Evening Post.*

THE RELATION OF EXTERNAL CHARACTERS OF CORN TO YIELD[1]

By Severo J. Mariano

The popular belief among the Filipino farmers is that the yield of corn, per unit area, could be increased through the selection of ears of certain special external characters. The long ear, for instance, is believed to be a better yielder than the short ear, and the middle kernels to be more productive than either the kernels of the butt or of the tip of the ear. This idea of ear characters being correlated with yield seems to be still prevalent also in some government institutions.

Not many years ago, a campaign for increased corn production was undertaken by the Bureau of Education. The campaign was based on the idea that the production of corn could be increased by using seeds only from the middle portion of the ear. The big poster of the Bureau of Education, scattered all over the Islands, recommended that the kernels from the butts and tips of the ears should be discarded. The results of that campaign have never been published in detail.

Later, the Bureaus of Education and Agriculture officially adopted a score card which places a great deal of value on certain good features of the corn ear.

Under the conditions set forth above, the writer feels that it is high time that certain experiments, which have a definite bearing on the external characters of the Philippine corn ear, be carried out in these Islands.

REVIEW OF PREVIOUS WORK

The first definite work on the relation of external characters of corn to yield dates back to about 1904. The Ohio Agricultural Experiment Station first undertook the study of the relation of length of ear to yield. One year later, the investigation was extended to other ear characters, as the shape, the weight, the filling of tip, the indentation of kernel, and the effect of environment on the value of seed corn. In 21 out of 22 tests, (1) from 1905 to 1909, the long ears produced higher yield than the short ears, the average difference being 3.97 bushel per acre. Five varieties tested in 1909 yielded in favor of the long ears. The greatest gain was observed in the ears where there was greater difference in length between long and short ears. But "the difference in yield seems to result from a lessened yield due to selection of short ears rather than to an increased yield from the selection for long ears."

Montgomery (2) reported a comparison between long smooth type of ear, selected from Reid's Yellow Dent, and the standard type, which was elongated and comparatively rough. The trial was conducted for four years and gave the following result: That the smooth type gained by 4.4 bushel per acre over the standard rough, less elongated type. He further reported that, in 1906, 204 ears were planted ear-to-row to find out the effect of weight of the ear on its yield, and in the following year, another 204 ears were planted. The results for two years showed that there was no relation between the weight of the parent ears and the yield of the corresponding rows.

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[1] Thesis presented for graduation from the College of Agriculture, No. 115; Experiment Station contribution, No. 38.

Hickman, (3) in his nine-year study of the yield of grains from the tip, middle, and butt of the ear, summarized his results as follows: "Repeated experiments show that neither the yield nor the quality of grain is materially affected by growing the crops from either the butt, middle and tip grains." The only objection in the use of the kernels from butt and tip is their irregular shape so that when planting is done in corn planter, they do not come out evenly. But as to chemical constituents, according to the chemists of the station, "they showed to be the same in feeding value as that of the middle."

Williams and Welton (4) tested in 1909 to 1915 ears of different characters, such as long and short, cylindrical and tapering, ears with bare and filled tips, rough and smooth and dented, heavy and light, ears with high, medium, and low number of rows. The results which they obtained and which bear a direct relation to the present study were as follows:

Long vs. short ears.—A ten-year average showed a difference of 1.39 bushels per acre in favor of the long ears. This difference was regarded by the authors themselves as "no greater than might have been expected had the seed used been identical."

High. low, and medium number of rows.—The number of rows of ear tested were 14, 16, and 18 for five years. They were tried in three different places. The 14-rowed ears gave the highest yield in two places, while the 16-rowed ears led the other two. The authors concluded that, "with this as with other ear characters, the yield is but slightly affected by this type of selecton."

Pearl and Surface (5) tested two groups, of five ears each, of sweet corn. One group was excellent and the other was very inferior, so much so that the difference between them was very striking. The excellent group of ears yielded 1.1 bushel higher than the inferior group. The harvest from each group was compared as to the amount of good corn produced, but no striking difference was found.

These two authors also collected a large amount of data on the relation of weight of ears to yield. Although not all of these have been compiled, the writers concluded that the weight of ears had no relation to their yield.

Love (6) worked on the correlation of certain ear characters, and he arrived at the following conclusions: Regarding length of ear he found "a slight advantage in favor of the long ears." In weight of ear, the gain in yield was in favor of the heavy ears in three out of four comparisons. Regarding the relation between the number of rows and yield, he found that ears with small number of rows outyielded those with a greater number of rows in two out of three trials. The author concluded that "the number of rows does not have much influence upon the yield. No relation is indicated. Shape of ear has no influence in yield."

Love and Wentz (7) studied the seed ear character of Cornell 12 corn, a selection from Funk Ninety Days. They found that there was no significant correlation between yield on the one side, and length of ear, ratio of tip circumference, average circumference of cob, weight of kernels, and number of rows of kernels, on the other.

Cunningham (8) tested long, medium, and short ears, as regards yield, and found no significant difference. As regards circumference, there was a slight advantage in favor of the smaller ones. Filled butts and tips bore no relation to yield. In eight-year tests the rough produced more than the smooth while the medium rough gave the greatest production.

Ewing (9) studied the relation to yield of different characters of the corn other than ear characters. The characters, which he studied, were diameter of the stalk, length of leaf, breadth of leaf, height of matured plants, and length of ear at the appearance of silk. The weight of grains per stalk was the standard used in finding the yield value of different characters. His conclusion was that "no single character has shown itself so closely connected with the yield of grain as to stand out as a safe guide to the breeder."

Olson et al. (10) at the Minnesota Experiment Station, made investigations on: (1) The improvement of corn by means of ear-to-row selection, in which the score card data of the ears used were taken, and (2) the relation between certain ear type and yield. In the first phase of the work, the following score card data for the ear were involved: The length of ear, weight, shelling percentage, circumference, butts and tips, kernel uniformity, variety character, maturity, and total score. The investigation arrived at the following conclusion: "The correlation coefficients which appear to be significant are significant from the statistical standpoint only. They are certainly not significant from the practical standpoint. However, disregarding any arbitrary limit, it is perfectly obvious that none of the present coefficients indicate sufficient increases as a result of selection. This applies with equal force to all results from the analyses of the ear -to-row data."

The second phase of the work dealt with different types of ears as show ears, elongated, short thick ears, tapering ears. Each type was planted in a separate plot. The results, in brief, for three years were as follows:

1914. "Show ears and the thick ears were outstanding in yield. A significant relation existed between weight and yield. No relation existed between length of ear and yield.

1915. Show ears and small ears appeared to be low yielders. No relation was indicated in case of the other types.

1916. Some positive relation was indicated in case of tapering and small ears, and some negative relation appeared to exist in case of slender rough ears. There is no consistent relation shown when results for different years are compared."

In the Ohio Experiment Station, McCall, and Wheeler (11) found out that ear characters are not correlated with yield. The data were taken from 600 ears, and covered a period of five years. The authors concluded that, "so far as these tests are concerned, neither length, width, circumference nor density of ear is correlated with yield."

Lacy (12) reported that kernels from different parts of the ear are of equal yield value for seed purposes. The work, she reviewed, covered an aggregate period of 45 years. She found that the average yield of seed from the tip was 105 per cent of the seed from the middle and the seed from the butt was 103 per cent of that of the middle.

From this review of previous work, it would appear that the weight of evidence is against the idea that external characters of the corn plant are correlated with yield. While accepting this evidence, nevertheless, it is advisable that the question be investigated with Philippine materials and under Philippine conditions so that the College may be in a better position to give advice on corn breeding.

THE PRESENT WORK

The object of the present work was to determine the relative yield value of long and short ears, of seeds from different parts of the ear, and, of ears of different number of rows of kernels.

This work was begun in June, 1919, and closed in March, 1920. It was carried out in the College of Agriculture, University of the Philippines.

MATERIALS AND METHODS

In these experiments, the Calamba Yellow Flint variety was used.

From a pile of corn, thirty ears of each of the long, short, and check groups, were selected according to measurements. Ears which were 14 centimeters and below in length were considered short ears while those which were 16 centimeters or above were considered long. The ears for check were picked at random so that they included long as well as short and medium ears. Each ear was given a separate number and then it was shelled.

The selection for the 12, 14, and 16, rowed ears was made from the same pile of corn. Each ear was numbered and shelled separate.

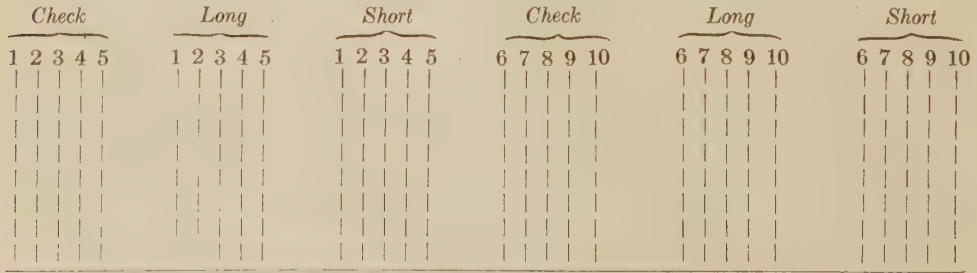
For the study of kernels from the butt tip and middle of the ear, seeds were obtained as follows: Seeds were shelled from a portion of the butt, one and one-half inch long and were disignated as butt seeds. Similarly, from a one and one-half inch portion of the tip of the same ear, seeds were obtained and were designated as tip seeds. The remaining seeds in the ear were designated as middle seeds.

Table I gives the dimensions of the ears which were used in the test of long and short ears.

EXPERIMENTS AND RESULTS

The land used was located on the newly acquired Experiment Station ground. It was first plowed with disc plow attached to a tractor and then harrowed with the help of the tractor. When the land was about ready for planting, furrows were made by a furrower drawn by a bullock.

The seeds were planted 75 centimeters apart in the row. The rows were one meter apart. Each individual ear was planted in one row. The 30 ears in each group were divided among sub-groups of five each. Each sub-group occupied five rows, and it alternated with sub-groups of another character. The position of the different sub-groups may be explained better with the help of the following planting diagram:



The purpose of the distribution of different plots of the same character, throughout the field, was to get an even effect of soil fertility. If all the cultures of one type, that is, if all long ears were planted in only one portion of the field, it might be possible that such part of the field is richer than the other which may be planted with short ears. Consequently, there would be a marked difference in yield between the different type groups. For this reason the even distribution of different sets of cultures in the field will tend to reduce the experimental error in yield due to non-uniformity of soil conditions. The other plantings involving the other characters were made in the same way as the first type, except that instead of there being five rows for each character, there were only two.

The long and short ear cultures, and that of the check, were planted on June 5, 1919. Due to weather conditions and delayed preparation of the land, the cultures on the other two sets of characters were not planted until 15 days later. About the end of the month of September, the cultures on the first set of character were harvested.

The second planting was done on November 14, 1919, and was harvested on March 3, 1920. The seed for the second planting was taken from the first harvest.

Tables II to IX show the results of the different plantings.

Tables II and V show the results of tests of long and short ears in the first and second plantings, respectively.

Tables IV and VI show the relative yield value of kernels from different parts of the ear,—the tip, the middle, and the butt.

Tables III and VII show the results of plantings on the relation of number of rows to yield.

Table VIII summarizes the results of the different cultures in the first planting, and Table IX of the different cultures in the second planting.

DISCUSSION OF RESULTS

First Planting

The rainy season crop was much damaged by unfavorable weather conditions. More individual plants than what Tables II, III, and IV show, would have produced ears if it had not been for the strong winds which prevailed during the tasseling period.

Relation of length of ear to yield.—Referring to Table II, it is noted that the long ears gave the highest average yield in six trials and they outyielded the check in four cases When the average, however, is considered, which should be done if it is desired to minimize the error due to non-uniformity of soil conditions, it will be noticed, in Table VIII, that the long ears outyielded the check only by 0.09 $\pm$0.24 kilograms per 100 plants This difference is insignificant

The short ears exceeded the check and long ears in three trials. In the final average the short ears gave higher yield than the check. The difference in yield between the short and check ears was 0.07$\pm$0.39 kilograms per 100 plants in favor of the short, while the short was exceeded by the long ears by 0.02$\pm$0.43 kilograms. Neither of these differences is significant.

The length of parent ears, short ears and check ears, which were used, should perhaps be considered at this point. The long ears were from 16.1 centimeters to 19.0 centimers long; the check ears, from 13.2 centimeters to 17.5 centimeters

and the short ears from 11.3 centimeters to 13.4 centimeters. It will be noticed that these classes differ from one another in a significant degree, so that if length of ear be correlated at all with yield, the long, check, and short ears should give significant differences in yield. The average length for the long ears was 17.5 centimeters; of the short ears 12.2 centimeters. There was a difference in length of 5.3 centimeters in favor of the long ears. Table VIII shows no significant difference at all in yield in favor of the long ears.

Number of rows to the ear.—In the study of this character there were nine sets of cultures for each of the check and the 16-rowed ears, and eight sets, for each of the 12-rowed and 14-rowed ears. With one exception, the 16-rowed ears outyielded the check. The 12-rowed ears yielded more than the check in six out of eight trials. Taking the average, the 16-rowed ears apparently yielded more than either the check or the 12-rowed ears or the 14-rowed ears, the difference, however, was insignificant as may be seen in Table VIII. The gain in yield of the 16-rowed ears and the 14-rowed ears over the check was 0.79 ± 0.29 kilograms and 0.49 ± 0.28 kilograms respectively, while that of the 12-rowed ears was 0.38 ± 0.32 kilograms. These gains are per 100 plants, based on a total of 900 plants in the case of 16-rowed ears, and on 800 plants, in the case of both 14-rowed and 12-rowed ears.

Relation of parts of ear to yield.—The result in this trial showed that the kernels from neither the butt, the middle, nor the tip of the ears exceeded the check in yield in the final average based on 600 plants. There were six test plots of each of the check, middle, and tip. The butt was represented in five test plots. In three out of six cases, the tip seems to have yielded more than the check cultures. The butt gave a higher average yield than either the middle or the tip. The average yield of the middle seems to be greater than that of the tip, and the butt seems to have yielded more than the middle by 0.12 ± 0.22 kilograms. When all these differences, however, are considered in relation with their respective probable errors, it is found that none of these differences is significant. It has been the general supposition that the middle kernels are the best part of the ear for seed purposes. The results of these experiments show, however, that in yield value, seeds from the tip or butt are as good as those from the middle part of the ear.

Second Planting

In the second planting the results were based on a greater number of plants than in the rainy season crop. The number of plants in each character culture was duplicated in this second trial.

Length of ear to yield.—There were 14 test plots in the second trial of each of the long, short, and check ears. The results of these tests confirmed those of the first planting, namely, that the long ears gave the apparent highest average yield over the check and over the short ears. In eight cultures out of 14, the long ears gained in yield over the check; the short ears also gained in yield over the check in eight out of 14 cultures. The yield of the short ears in the first and second plantings nearly equaled that of the long ears. The difference in yield being 0.01 ± 0.37 kilograms in this trial per 100 plants based on a total of 1400 plants.

The measurements of the kinds of ears used in the second planting give these averages. For the long ears, the average length was 17.9 centimeters, the short, 12.2 centimeters and the check 15.5 centimeters. It is evident that the excess in length of long ears over the short ears was 5.7 centimeters which was greater by 0.9 centimeters than that of the first planting.

Number of rows to the ear.—The result in this experiment shows that the 14-rowed ears led in yield over the others. There were nine sets of cultures of each in this trial. The 14-rowed ears excelled the check in seven out of nine trials, while the 12-rowed ears and the 16-rowed ears were excelled by the check in six and five instances respectively. The difference in yield between the 14-rowed ears and the check was 1.45 ± 0.53 kilograms, that of the 14-rowed ears and the 12-rowed ears was 1.74 ± 0.53 kilograms. In the latter, the difference in yield indicates that the chances of 14-rowed ears yielding more than the 12-rowed ears are 21 to 1.

Relation of parts of ear to yield.—The same result was obtained in this trial as in the corresponding previous planting. The check ears again exceeded the yield of all the other characters. The butt stood next to the check in average yield, while the tip was the poorest.

It would be of interest to know the value of external characters of corn with regard to yield. As far as the present results show, it would be of no value to select ears longer than the general average, or ears of greater number of rows, or to plant kernels from certain parts of the ear and expect a higher yield. Long or short ears, ear with greater or less number of rows or any normal kernel from any part of the ear would seem to have the same yielding ability according to these experiments.

SUMMARY OF CONCLUSIONS

1. Available literature, which was reviewed, shows that the weight of experimental evidence is against the belief that the external characters of the corn are related to its yield.

2. In this work, yield tests were made, in two successive plantings, of ears of different lengths, ears of different number of rows, and, of kernels from different parts of the corn ear.

3. There was found no relation between length of seed ear and yield.

4. The difference in yield between ears of 16 rows on the one side, and ears of 12 rows and ears constituting the check, on the other, was not significant. The difference in yield found between the ears of 14 rows and the ears constituting the check was not significant in the two-year plantings. Comparing the 14-rowed ears with the 12-rowed ears, the difference in yield was not significant in the first year, and in the second year, the chances were 21 to 1 that the 14-rowed ears yielded more than the 12-rowed ones.

In two-year plantings, results showed that the kernels from different parts of the ear had the same yielding value.

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TABLE I.—*Length of ears used in the tests of long and short ears.*

First planting.				Second planting.			
Ear number.	Check.	Long.	Short.	Ear number.	Check.	Long.	Short.
	cm.	*cm.*	*cm.*		*cm.*	*cm.*	*cm.*
1	14.2	18.0	12.5	1	15.2	18.5	11.0
2	14.0	18.1	12.8	2	17.0	17.1	12.8
3	14.3	19.0	11.3	3	15.2	18.4	11.9
4	16.5	17.2	12.5	4	16.0	17.4	12.0
5	14.5	18.0	12.1	5	15.9	17.6	12.5
Ave. of ears 1-5	14.7	18.0	12.1	Ave. of 1-5	15.9	17.8	12.0
6	14.3	18.5	12.4	6	17.0	17.4	11.5
7	14.4	18.3	12.8	7	15.4	18.5	12.0
8	13.4	18.0	11.7	8	16.0	17.7	11.5
9	15.4	17.0	12.3	9	15.2	17.0	11.0
10	13.2	18.0	12.4	10	14.0	17.6	12.4
Ave. of ears 6-10	14.1	18.0	12.3	Ave. of 6-10	15.5	17.6	11.7
11	13.4	17.0	13.1	11	14.9	18.7	12.7
12	17.5	16.8	12.0	12	14.0	17.0	11.9
13	14.0	16.5	13.2	13	17.6	19.0	12.0
14	13.8	16.1	11.3	14	15.1	18.6	12.0
15	15.5	16.3	11.5	15	16.7	17.1	12.9
Ave. of ears 11-15	14.8	16.5	12.2	Ave. of 11-15	15.7	18.7	12.1
16	13.8	16.5	13.0	16	16.0	18.1	11.5
17	13.5	17.5	12.5	17	14.5	17.4	11.6
18	14.2	16.8	12.3	18	16.0	19.5	11.4
19	14.0	18.0	13.4	19	15.7	17.7	12.5
20	13.9	16.9	13.7	20	14.5	18.2	13.7
Ave. of ears 16-20	13.9	16.9	12.7	Ave. of 16-20	15.4	18.6	12.1
21	13.4	16.2	12.5	21	15.4	18.3	11.5
22	13.2	16.1	11.3	22	16.1	17.5	12.5
23	14.7	16.5	11.5	23	15.9	17.5	12.3
24	14.0	16.4	11.7	24	14.0	17.2	13.2
25	13.6	16.3	12.0	25	13.4	17.6	12.5
Ave. of ears 21-25	13.8	16.3	11.8	Ave. of 21-25	15.0	17.6	12.4
26	15.5	16.6	11.8	26	16.0	17.4	13.0
27	14.5	13.2	12.3	27	15.0	17.5	11.0
28	15.4	16.5	12.0	28	14.5	19.6	12.4
29	16.4	17.1	11.0	29	16.7	17.9	12.8
30	15.5	16.9	12.5	30	16.7	18.0	13.0
Ave. of ears 26-30	15.5	17.1	11.7	Ave. of 26-30	15.8	18.0	12.6
Ave. length of ears 1-30	14.3	17.1	12.3	Ave. length of ears 1-30	15.5	17.9	12.2

TABLE II.—*Relation of length of ear to yields in the first planting.*

	Row Number.	Check.		Long ears.		Short ears.	
		No. of plants.	Yield.	No. of plants.	Yield.	No. of plants.	Yield.
Yields of actual number of plants.			*kg.*		*kg.*		*kg.*
	1-5	160	12.1	234	19.5	221	19.3
	6-10	138	11.2	168	14.0	151	13.9
	11-15	108	8.8	227	20.4	200	15.2
	16-20	194	17.7	369	34.9	241	19.4
	21-25	98	9.2	188	15.9	114	13.9
	26-30	111	9.0	61	4.5	98	5.0
	TOTAL	809	68.0	1247	109.2	1025	86.7
Computed yields on basis of 100 plants.	1-5	100	7.51	100	8.33	100	8.73
	6-10	100	8.12	100	8.33	100	9.26
	11-15	100	8.15	100	8.99	100	7.6
	16-20	100	8.12	100	8.46	100	8.05
	21-25	100	9.38	100	8.45	100	12.18
	26-30	100	8.11	100	7.31	100	5.01
	TOTAL		50.39		50.39		50.83
	Average		8.4		8.49		8.47
	Probable error of the average.		±0.166		±1.76		±1.19

TABLE III.—*Relation of parts of ear to yield in the first planting.*

	Row number.	Check.		Butt.		Middle.		Tip.	
		No. of plants.	Yield.	No. of plants.	Yield.	No. of plants.	Yield.	No. of plants.	Yield.
Yields of actual number of plants.			*kg.*		*kg.*		*kg.*		*kg.*
	1-2	40	2.5	112	5.7	111	6.2	111	4.4
	3-4	186	8.9	165	7.3	156	8.2	126	7.0
	5-6	110	4.9	171	7.2	171	7.2	105	3.7
	7-8	193	8.9	126	4.7	78	3.4	116	4.5
	9-10	118	3.6	172	7.2	123	4.0	67	2.2
	11-12	160	7.1	—	—	89	3.1	162	7.5
	TOTAL....	807	35.9	746	32.1	728	31.2	687	27.3
Computed yields on basis of 100 plants.	1-2	100	6.25	100	5.08	100	4.68	100	3.96
	3-4	100	4.78	100	4.42	100	5.23	100	5.56
	5-6	100	4.45	100	4.21	100	4.26	100	3.52
	7-8	100	4.56	100	3.78	100	4.37	100	3.87
	9-10	100	3.05	100	4.18	100	3.25	100	3.28
	11-12	100	4.44	100	—	100	3.48	100	4.62
	TOTAL....	600	27.53	500	21.67	600	25.27	600	24.81
	Average		4.59		4.33		4.21		4.14
	Probable error of the average		±0.256		±0.124		±0.192		±0.209

TABLE IV.—*Relation of number of rows to yield in in the first planting.*

	Row number.	Check.		12-rowed ears.		14-rowed ears.		16-rowed ears.	
		No. of plants.	Yield.	No. of plants.	Yield.	No. of plants.	Yield.	No. of plants.	Yield.
			kg.		*kg.*		*kg.*		*kg.*
Yields of actual number of plants.	1-2	188	11.5	132	7.8	91	5.8	180	11.3
	3-4	40	2.5	69	4.0	45	2.4	79	4.8
	5-6	181	8.1	75	4.7	36	2.4	48	3.0
	7-8	90	6.8	48	3.1	64	5.0	70	6.1
	9-10	78	4.8	117	7.6	51	3.2	60	3.8
	11-12	45	2.3	45	2.7	72	3.9	54	3.2
	13-14	109	6.4	169	10.0	153	9.4	123	8.6
	15-16	55	2.7	119	9.7	169	11.4	168	10.2
	17-18	186	13.2	—	—	—	—	18	8.7
	TOTAL....	972	63.3	784	50.6	777	43.2	890	59.9
Computed yields on basis of 100 plants.	1-2	100	5.85	100	5.15	100	6.04	100	6.27
	3-4	100	6.25	100	5.79	100	5.33	100	6.08
	5-6	100	4.47	100	6.45	100	6.67	100	6.25
	7-8	100	7.56	100	6.46	100	7.81	100	8.71
	9-10	100	6.15	100	6.49	100	6.27	100	6.33
	11-12	100	5.11	100	6.00	100	5.42	100	5.93
	13-14	100	5.87	100	5.92	100	6.79	100	7.16
	15-16	100	4.91	100	8.15	100	6.91	100	6.07
	17-18	100	7.09	—	—	—	—	100	7.59
	TOTAL....	900	53.26	800	50.41	800	51.40	900	60.39
	Average		5.92		6.30		6.41		6.71
	Probable error of the average		±0.206		±0.214		±0.186		±0.204

TABLE V.—*Relation of length of ear to yield, in the second planting.*

	Row number.	Check.		Long ears.		Short ears.	
		No. of plants.	Yield.	No. of plants.	Yield.	No. of plants.	Yield.
			kg.		*kg.*		*kg.*
Yields of actual number of plants.	1-2	130	13.64	224	20.4	222	16.4
	3-4	228	17.51	262	19.96	274	19.6
	5-6	248	20.1	302	23.10	188	22.71
	7-8	254	20.72	352	27.10	258	23.60
	9-10	252	19.81	224	19.10	252	24.05
	11-10	259	20.10	215	20.90	242	22.45
	13-14	266	25.42	276	26.90	308	30.70
	15-16	270	23.30	200	19.00	221	23.60
	17-18	267	25.80	252	23.90	214	29.58
	19-20	226	19.02	152	13.95	259	24.62
	21-22	287	21.60	242	22.91	281	27.98
	23-24	247	31.62	252	22.12	245	22.10
	25-26	232	25.21	173	21.52	194	23.58
	27-28	288	33.00	181	22.80	215	22.50
	TOTAL	3554	316.83	3158	304.56	3473	323.47
Computed yields on basis of 100 plants.	1-2	100	10.42	100	9.11	100	7.39
	3-4	100	7.71	100	7.62	100	7.15
	5-6	100	8.10	100	7.65	100	7.89
	7-8	100	8.16	100	7.10	100	9.14
	9-10	100	7.86	100	8.53	100	9.54
	11-12	100	7.76	100	9.68	100	9.28
	13-14	100	9.56	100	9.76	100	9.28
	15-16	100	8.63	100	9.95	100	10.68
	17-18	100	9.66	100	9.48	100	9.15
	19-20	100	8.42	100	9.18	100	9.51
	21-22	100	7.53	100	7.47	100	9.96
	23-24	100	9.11	100	9.78	100	9.00
	25-26	100	10.87	100	12.44	100	12.15
	27-28	100	11.46	100	12.60	100	10.47
	TOTAL	1400	125.25	1400	131.95	1400	131.38
	Average		8.95		9.39		9.38
	Probable error of the average		±0.225		±0.291		±0.226

TABLE VI.—*Relations of parts of ear to yield, in the second planting.*

	Row number.	Check.		Butt.		Middle.		Tip.	
		No. of plants.	Yield.	No. of plants.	Yield.	No. of plants.	Yield.	No. of plants.	Yield.
Yields of actual number of plants.			*kg.*		*kg.*		*kg.*		*kg.*
	1-2	184	22.90	212	21.50	271	22.00	278	24.6
	3-4	301	25.95	228	18.9	193	16.10	192	15.10
	5-6	238	19.0	254	20.40	247	18.30	234	19.40
	7-8	241	19.3	214	16.10	184	15.20	221	14.61
	9-10	200	17.6	217	15.60	223	10.20	264	8.50
	11-12	232	9.8	244	10.80	278	15.40	228	14.0
	13-14	206	10.28	180	10.40	215	8.6	247	11.20
	15-16	175	8.3	166	7.3	165	7.3	164	7.7
	TOTAL	1477	123.05	1715	121.00	1776	113.10	1828	117.11
Computed yields on basis of 100 plants.	1-2	100	12.45	100	10.14	100	8.12	100	8.92
	3-4	100	8.62	100	8.24	100	8.34	100	7.85
	5-6	100	7.98	100	8.03	100	7.47	100	8.29
	7-8	100	8.01	100	7.53	100	8.29	100	6.61
	9-10	100	8.80	100	7.19	100	4.57	100	3.22
	11-12	100	4.22	100	4.43	100	5.54	100	6.14
	13-14	100	4.95	100	5.78	100	4.00	100	4.53
	15-16	100	4.74	100	4.39	100	4.42	100	4.09
	TOTAL		59.77		55.65		50.60		49.65
	Average		7.47		6.96		6.34		6.21
	Probable error of the average		±0.192		±0.136		±0.132		±0.146

TABLE VII.—*Relation of number of rows to yield, in the second planting.*

	Row number	Check.		12-Rowed Ears.		14-Rowed Ears.		16-Rowed Ears.	
		No. of Plants.	Yield.	No. of Plants.	Yield.	No. of Plants.	Yield.	No. of Plants.	Yield.
Yields of actual number of plants.			*kg.*		*kg.*		*kg.*		*kg.*
	1-2	192	21.30	261	30.12	178	18.80	212	20.58
	3-4	191	21.50	212	21.00	252	21.62	224	22.00
	5-6	288	17.15	241	21.22	138	14.60	162	15.40
	7-8	177	15.30	182	17.60	135	15.41	164	19.10
	9-10	221	23.40	245	24.95	176	19.00	223	20.4
	11-12	203	22.15	178	18.57	188	22.00	144	18.1
	13-14	256	25.20	204	19.43	157	17.00	89	11.9
	15-16	187	17.80	242	20.90	108	16.82	216	20.9
	17-18	198	19.60	174	18.60	97	15.20	71	8.4
	TOTAL	1113	180.10	1939	182.29	1429	160.45	1505	136.78
Computed yields on basis of 100 plants.	1-2	100	11.09	100	11.54	100	10.56	100	9.71
	3-4	100	11.26	100	9.91	100	8.58	100	9.82
	5-6	100	9.59	100	8.76	100	9.86	100	9.51
	7-8	100	8.64	100	9.67	100	11.34	100	11.03
	9-10	100	10.59	100	10.14	100	10.79	100	9.15
	11-12	100	10.91	100	10.42	100	11.70	100	12.62
	13-14	100	9.84	100	9.52	100	10.82	100	13.45
	15-16	100	9.94	100	8.64	100	18.57	100	9.21
	17-18	100	9.89	100	10.68	100	15.11	100	11.83
	TOTAL		91.75		89.28		104.93		96.23
	Average		10.19		9.91		11.60		10.70
	Probable error of the average		±0.178		±0.173		±0.501		±0.336

TABLE VIII.—*Summary of averages of first planting.*

Characters compared.	Difference in yield.	Value of difference.
1. Long ears minus short ears	0.02 ± 0.43	Insignificant
2. Long ears minus check	0.09 ± 0.24	Insignificant
3. Check ears minus short ears	—0.07 ± 0.39	Insignificant
4. 16-rowed ears minus 14-rowed ears	0.30 ± 0.28	Insignificant
5. 16-rowed ears minus 12-rowed ears	0.41 ± 0.29	Insignificant
6. 16-rowed ears minus check ears	0.79 ± 0.29	Insignificant
7. 14-rowed ears minus 12-rowed ears	0.11 ± 0.28	Insignificant
8. 14-rowed ears minus check ears	0.48 ± 0.28	Insignificant
9. 12-rowed ears minus check ears	0.38 ± 0.32	Insignificant
10. Middle minus chech	0.38 ± 0.21	Insignificant
11. Middle minus tip	0.07 ± 0.28	Insignificant
12. Middle minus butt	0.12 ± 0.22	Insignificant

TABLE IX.—*Summary of averages of second planting.*

Characters compared.	Difference in yield.	Value of difference
1. Long ears minus short ears	0.01 ± 0.37	Insignificant
2. Long ears minus check	0.44 ± 0.37	Insignificant
3. Check minus short ears	—0.43 ± 0.33	Insignificant
4. 16-rowed ears minus 14-rowed ears	—0.96 ± 0.60	Insignificant
5. 16-rowed ears minus 12-rowed ears	0.78 ± 0.37	Insignificant
6. 16-rowed ears minus check ears	0.79 ± 0.28	Insignificant
7. 14-rowed ears minus 12-rowed ears	1.74 ± 0.53	Significant[a]
8. 14-rowed ears minus check ears	1.45 ± 0.53	Insignificant
9. 12-rowed ears minus check ears	0.37 ± 0.21	Insignificant
10. Middle minus check ears	—1.13 ± 0.20	Insignificant
11. Middle minus tip	—0.13 ± 0.20	Insignificant
12. Middle minus butt	—0.62 ± 0.21	Insignificant

[a]According to recognized biometrical rules, the significance or value of this difference merely shows that the chances are 21 to 1 that the 14-rowed ears yielded more than the 12-rowed ones.

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A DIGEST OF "FILIPINO FEMINISM"[1]

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"Lying midway between the dainty kimono maid of Japan and the veiled lady of India, and alongside the 'lily-footed' dame of China," says Miss Yule in the June *Scribner's*, "is a type of feminism unique in the Orient." Unique because of her advanced social position, her economic status, and the moral influence she exerts on the Filipino home.

The difference between the Filipino woman and her Oriental sister according to this article may be largely attributed to the fact that she is the only Christian woman in the Orient. Even in ante-Spanish days, the woman of the Philippines was given a definite place in society and granted special rights and prerogatives. During the three and one-half centuries of Spanish influence she adopted the outward manners of Spain, but remained essentially a "Filipina."

With the advent of American occupation her already strong position was made stronger. The equality of opportunity of education regardless of sex, so long denied her, was immediately taken advantage of. She has forged ahead by leaps and bounds. To-day there is no walk in life in which Filipino women are not represented. Education, nursing, and pharmacy appear to be their favorite professions though they are also found in law, medicine, and agriculture.

The position of the Filipino woman in industry is what makes her stand out when compared with the women of Japan, China, and India. She occupies a definite status in the economic problem. Although marketing is her particular forte, she is found in all the household industries as lace-making, embroidering, hat and pottery making. Nowhere do we find her engaged in the so-called special feminine work exclusively. "One thing is noticeable, that the Filipino woman is rarely seen performing heavy work, carrying burdensome loads fit only for animals as may be seen in China and Japan, and in some countries in Europe. She is not seen working on roads, around docks, neither does she dig or plough the soil on the farm."

Marriage does not mean that a woman in the Philippines relinquishes her individuality, or her property, and that her identity becomes completely merged with that of her husband. She retains her property and manages it with all the ability usually attributed to man. In the Islands, "It is so common a thing that it does not cause the comment that it would in the United States to find a woman managing a rice farm, a coconut or a sugar plantation. Frequently women are sole or part owners in rice mills, oil mills, and similar enterprises. The equal inheritance law which obtained even in ante-Spanish days accounts partially for the rather unusual business activity among the women of the Islands. Sisters share equally with their brothers the property left them by their parents, so this often throws the care and management of business directly into woman's hands, and she has proven equal to the task".

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[1]An article by Emma S. Yule, associate professor of English in the College of Agriculture, published in Scribner's Magazine Vol. LXVII, No. 6, pp. 738-746, 1920.

It might be thought that all feminine characteristics would be lost by a woman who buys, bargains, and sells. However, in spite of her position in industry, the Filipino woman remains typically feminine. She demands and receives her full share, and in many cases an over share, of masculine homage. Her moral influence in the home is tremendous in spite of her manifold activities. "As a moral force in the family, one may make the assertion and be far within the truth, that woman outranks man in *las Islas Filipinas*." "The ambition to stand well, to accumulate, to give the children greater opportunities, is generally greater in the wife than in the husband."

During the days of Spanish influence woman did not take a prominent part in movements for public improvement. Through the influence of the American women the Filipino woman to-day is rapidly taking her part in all branches of civic improvement. "Various kinds of co-operative associations among women exist in the Islands, some of them old, almost ancient, but an honest-to-goodness civic club is brand new, hence the significance of the spread of the movement. May, 1919, will be an historic date in the annals of women's clubs in the Philippines, for it marked the first Insular woman's club convention in the country. Considering her brief experience as a modern public worker, the Filipino woman shows ability and enthusiasm."

The future of woman in the Philippines is rosy indeed. She is constantly entering new occupations. However, there is a danger to the future of a nation "where man supinely shifts so much of his normal responsibility as a bread-winner, and a home-builder." "It is not in industrial competition alone that the danger signal flies, but in the mental attitude that accords to woman an exceptional homage and accepts smilingly her anomalous assumption of burdens that should rest on man's shoulders."

The Philippines may become "a land of perfect sex equality with apathetic chivalry tipping the scale a trifle in favor of gentle woman."

COLLEGE AND ALUMNI NOTES

Sam F. Trelease, associate professor of plant physiology, left for the United States on the *Empress of Russia* on August 19. Doctor Trelease is to be appointed to a position under Dr. B. E. Livingston in the department of plant physiology in Johns Hopkins University. He expects to assist in the graduate course in plant physiology and in editing botanical abstracts.

Evett D. Hester, associate professor of economics, returned from leave in the United States on the *Empress of Russia* on June 21.

Mrs. F. W. Ashton, wife of Prof. F. W. Ashton of the department of chemistry, left for the United States on July 26 on the U. S. A. T. *Sheridan*. She expects to make an indefinite visit.

Wm. M. Policoff was appointed professor of surgery in the College of Veterinary Science. Doctor Policoff graduated from the veterinary school of the University of Pennsylvania in 1914, where he served as an apprentice assistant to Dr. M. Bredt; was a practicing veterinarian of Philadelphia, Pennsylvania, from 1913 to 1916. He was employed as a Veterinary Inspector for the Department of Agriculture from 1917 to 1918. He entered the United States Army as a veterinary officer in April 1918 and remained in the military service until May 1920.

Dr. Alejandro Albert, under-secretary of public instruction, was appointed to temporarily fill the position of president of the University of the Philippines made vacant by the appointment of President Ignacio Villamor to the Supreme Court.

The third year class of the College of Veterinary Science was transferred to Los Baños at the opening of the college year. It is expected that the fourth and fifth years will move to Los Baños at the beginning of the second semester.

Mrs. Charlotte Raymond Gillis, assistant professor of English, resigned because of ill-health on July 6. Mrs. Gillis was connected with the College for many years.

Dean Charles F. Baker returned to duty on June 5 after an extensive trip through Mindanao in the interest of the Bureau of Non-Christian Tribes

RESOLUTION OF CONDOLENCE

Whereas, by the death of Pedro Talabac, a College of Agriculture student, which occurred on June twenty-fifth at the Philippine General Hospital, the college lost a promising student; and

Whereas, the said Pedro Talabac was highly esteemed by his college mates; therefore be it

Resolved, that the Student Body of the College of Agriculture express their sorrow for his untimely death and their sympathy for his family through this resolution; and be it further

Resolved, that this resolution be filed with the records of the Student Body of the College of Agriculture; that a copy thereof be sent to the family of the deceased; and that copies thereof be submitted to the *Philippine Agriculturist* and to the *Philippines Free Press* for publication.

THE COMMITTEE ON RESOLUTIONS
JULIO JAMIAS, *Chairman.*
EMILIO SANTA MARIA, *Member.*
JUAN AMORALA, *Member.*

Dated at the College of Agriculture, Los Baños, Laguna, the second day of July, nineteen hundred and twenty.

UNIVERSITY OF THE PHILIPPINES

COLLEGE OF AGRICULTURE

LOS BAÑOS

The College of Agriculture is in its eleventh year, with a student body of 444. It occupies a tract of about three hundred and sixty hectares on which every important crop in the Philippines is under cultivation. It has a large series of varieties of leading crops and very numerous introduced plants under tests and observation. The number of distinct cultures, not including series of fertilizer experiments, is more than two thousand. The College has fourteen concrete buildings and several of mixed materials.

The courses are:

A six-year course (the first two years' work being preparatory only) based on graduation with good grades from the intermediate schools of the Philippine Islands and leading to the degree of Bachelor of Agriculture.

A four-year course based on the completion of the public high school course, and leading to the degree of Bachelor of Science in Agriculture.

Graduate work leading to the degree of Master of Science is given to persons holding the degree of Bachelor of Science.

Tuition for non-residents of the Philippines is ₱150.00 a year.

The College year began June 9, 1919.

For further information address the Dean of the College.

UNIVERSITY OF THE PHILIPPINES

COLLEGE OF VETERINARY SCIENCE

The College of Veterinary Science, University of the Philippines, offers a five-year course leading to the degree of Doctor of Veterinary Medicine.

There are twenty Insular scholarships created by Act No. 2302 valued at ₱35.00 per month for students in the College of Veterinary Science, several municipal and provincial scholarships, and two scholarships made possible through the generosity of Mr. Mariano Limjap.

The demand for Filipino veterinarians was never greater.

The Bureau of Science and the Bureau of Agriculture require the services of veterinarians at an entrance salary of ₱1,800 per annum.

The field for private practice is as yet practically untouched.

For those wishing to enter upon a veterinary practice, there are desirable locations in all part s of the islands, as this field is as yet practically untouched.

At the Veterinary College positions as instructors, requiring the best trained men available, pay good salaries.

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